CLAIMS

1. A surface mount contact for attachment to a circuit board, comprising:

an elongate electrically conductive pin defining a shaft having a longitudinal axis and having an upper end and a lower end;

a pre-formed heat re-flowable bonding member attached to the lower end of the pin; and

an insulator surrounding the shaft of the pin intermediate the upper and lower ends and adjacent the pre-formed heat re-flowable bonding member.

2. The surface mount contact of Claim 1 wherein the pin has a cylindrical cross-section.

3. The surface mount contact of Claim 1 wherein the upper end of the pin is formed with a head with an outer surface that is dimensioned to be positioned on, and bonded to, a conductive pad on a circuit board, and the lower end of the pin is dimensioned and configured to be attached to a lower circuit board.

4. The surface mount contact of Claim 3 wherein the head is formed with at least one channel that opens through an outer surface of the head and a peripheral wall of the head.

5. The surface mount contact of Claim 1 wherein the pin is provided with a shoulder for establishing a predetermined vertical position along the longitudinal axis relative to a reference surface.

6. The surface mount contact of Claim 1 wherein the insulator is a collar.

7. The surface mount contact of Claim 1 wherein the pre-formed heat re-flowable bonding member is a solder ball.

8. The surface mount contact of Claim 7 wherein the insulator has a conductive pad formed on an upper surface thereof surrounding the shaft of the pin adjacent the pre-formed heat re-flowable bonding member.

9. The surface mount contact of Claim 1 wherein the insulator is made of a high temperature plastic resin or a printed circuit board material.

10. The surface mount contact of Claim 6 wherein the insulator collar is press

fitted around the pin.

11. The surface mount contact of Claim 1 wherein the pin is of copper or a copper alloy.

12. A discrete surface mount contact for soldering to a circuit board, comprising:

an elongate electrically conductive pin defining a shaft having a longitudinal axis and having a free upper end and a lower end;

a pre-formed heat re-flowable solder ball soldered to and fully surrounding the lower end of the pin; and

a discrete insulator surrounding and permanently attached to the shaft of the pin adjacent the pre-formed solder ball and sealing the shaft against solder migration.

13. The discrete surface mount contact of Claim 12 further comprising a discrete conductive collar mounted on and surrounding the shaft of the pin intermediate the insulator and upper end of the pin.

14. The discrete surface mount contact of Claim 13 wherein the diameter of the insulator exceeds the diameter of the solder ball.

15. The discrete surface mount contact of Claim 13 wherein the diameter of the insulator is smaller than the diameter of the solder ball.

16. The discrete surface mount contact of Claim 15 wherein the insulator is a coating on an intermediate position of the pin.

17 A circuit board assembly comprising:

an upper circuit board having contact postions;

a plurality of discrete electrically conductive pins each having a shaft with upper and lower ends, the upper ends of each of the pins being attached to the upper circuit board at one of its contact positions and being arranged in a predetermined pattern;

a plurality of insulators each surrounding an intermediate position of the shaft of a corresponding pin;

a lower circuit board opposing and generally parallel with the upper circuit board, the lower circuit board having a plurality of conductive pads arranged in the predetermined pattern; and

a plurality of conductive joints each formed by re-flow of a pre-formed heat re-flowable bonding member attached to the lower end of a corresponding pin, each conductive joint bonding the lower end of a corresponding pin and a corresponding conductive pad and forming an electro-mechanical bond therebetween.

18. The circuit board assembly of Claim 17 wherein both the attachments of the pin upper ends and the conductive joints are solder joints, and the solder joints are physically separated from one another by their respective insulator such that the solders at the two joints do not commingle.

19. The circuit board assembly of Claim 17 wherein the upper ends of the pins are inserted into corresponding vias in the upper circuit board and each pin has a conductive shoulder positioned between the insulator and the upper circuit board that establishes a predetermined longitudinal position of the pin relative to the upper circuit board.

20. The circuit board assembly of Claim 17 wherein each insulator is formed with a second conductive pad that is bonded by a corresponding second solder joint to a corresponding second conductive pad on the upper circuit board.

21. The circuit board assembly of Claim 17 wherein a first melting temperature of the solder in the solder joints of the pins to the contact position is above a second melting temperature of the solder in the solder joints that bond the lower ends of the pins to the conductive pads on the lower circuit board.

22. The circuit board assembly of Claim 17 wherein the upper end of each pin is formed with a head with an outer surface that is dimensioned to be positioned on, and surface bonded to, a second conductive pad on the upper circuit board.

23. The circuit board assembly of Claim 22 wherein the head is formed with at least one channel that opens through the outer surface of the head and a peripheral wall of the head.

24. The circuit board assembly of Claim 17 wherein the pre-formed heat re-flowable bonding member is made of a material selected from the group consisting of Tin/Lead solder, Tin/Bismuth solder, conductive epoxy, brazing compound, welding compound and solder paste.

25. A circuit board assembly comprising:

a generally planar upper circuit board having spaced plated through vias;

a plurality of electrically conductive pins each having a shaft with upper and lower ends, the upper ends of the pins being inserted in and attached to the plated through holes in the upper circuit board by a plurality of first solder joints and being arranged in a predetermined pattern;

a plurality of discrete insulators each surrounding the shaft of a corresponding pin;

a generally planar lower circuit board opposing and generally parallel with the upper circuit board, the lower circuit board having a plurality of conductive pads arranged in the predetermined pattern; and

a plurality of second solder joints formed by re-flowing **a** pre-formed heat re-flowable bonding member located on the side of the insulators facing the lower circuit board, each of the second solder joints bonding a lower end of a corresponding pin and a corresponding conductive pad, a first portion of the pins having lower ends that directly contact their corresponding conductive pads and a second portion of the pins having their lower ends spaced slightly above their corresponding conductive pads.

26. The circuit board assembly of Claim 25 wherein each of the lower ends of the pins are spaced from the bottom surface of their corresponding re-flowable bonding member by a thickness equal to about 0.010-0.020 inches.

27. The circuit board assembly of Claim 25 wherein the upper surface of the insulator has a conductive pad and the upper end of the pin extends above the conductive pad formed on the upper surface of the insulator.

28. The circuit board assembly of Claim 25 wherein each of the insulators separates the first and second solder joints such that their solders do not commingle.

29. The circuit board assembly of Claim 25 wherein each of the insulators comprises an insulating coating.

30. A circuit board assembly comprising:

a generally planar single-sided circuit board having spaced vias with at least one of the vias surrounded by an electrically-conductive trace on one of the board's sides;

at least one electrically conductive pin having a shaft with upper and lower ends, the upper end of the pin being inserted in and solder bonded to the one via in the circuit board by a first solder joint that also electrically connects the pin to the trace;

a discrete insulator surrounding the shaft of the pin intermediate its upper and lower ends;

a pre-formed heat re-flowable soldering member located on the side of the insulator adjacent the lower pin end and soldered to and fully surrounding the lower end of the pin;

the discrete insulator sealing to the shaft and preventing solder migration between the first solder joint and the re-flowable soldering member.